

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
17 March 2005 (17.03.2005)

PCT

(10) International Publication Number
WO 2005/024666 A3

(51) International Patent Classification⁷: **G06F 17/30**

(21) International Application Number:
PCT/US2004/024569

(22) International Filing Date: 29 July 2004 (29.07.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/646,580 21 August 2003 (21.08.2003) US
PCT/US03/26144 21 August 2003 (21.08.2003) US
10/693,574 24 October 2003 (24.10.2003) US

(71) Applicant (for all designated States except US): **MICROSOFT CORPORATION** [US/US]; One Microsoft Way, Redmond, WA 98052 (US).

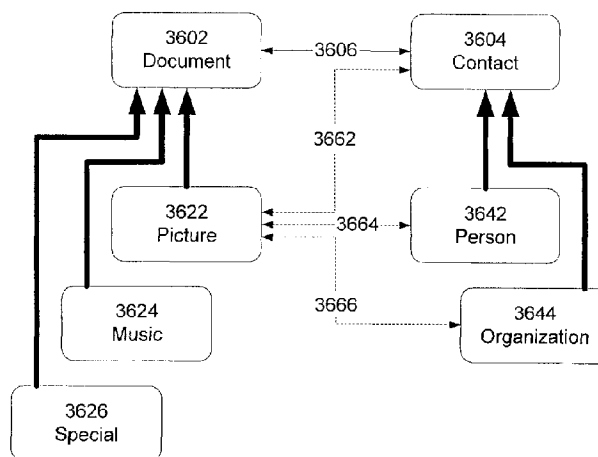
(72) Inventors; and

(75) Inventors/Applicants (for US only): **DEMIROSKI, Bekim** [MK/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **WHITNEY, Robert, T.** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **THOMPSON, Patrick, J.** [GB/US]; Microsoft Corporation, One Microsoft Way,

Redmond, WA 98052 (US). **NORI, Anil, K.** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **AGARWAL, Sameet** [IN/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **CELIS, Pedro** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98053 (US). **CAMP-BELL, David, G.** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **TEREK, F. Soner.** [TR/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **CAMERON, Kim** [CA/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **SMITH, Walter, R.** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **SHAKIB, Darren, A.** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **BALLOU, Nathaniel, H.** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **ACHARYA, Srinivasmurthy, P.** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **RAMAN, Balan, Sethu** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US). **SPIRO, Peter, M.** [US/US]; Microsoft Corporation, One Microsoft Way, Redmond, WA 98052 (US).

[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR EXTENSIONS AND INHERITANCE FOR UNITS OF INFORMATION MANAGEABLE BY A HARDWARE/SOFTWARE INTERFACE SYSTEM



(57) Abstract: By modeling real-world application objects with complex structures, behaviors, and operations described by a schema which is enforced by the hardware/software interface system, various embodiments of the present invention provide rich sub-typing functionality (3602, 3604, 3606, 3622, 3624, 3626, 3642, 3644) by extending Items using extensions which provide additional data structure to already existing items type structures. Extensions are strongly typed instances that cannot exist independently and must be attached to an item or a Nested element. Extensions are also intended to address multi-typing issues by enabling the overlap of type instances.

WO 2005/024666 A3

WO 2005/024666 A3



(74) **Agents:** ROCCI, Steven, J. et al.; Woodcock Washburn LLP, One Liberty Place, 46th Floor, Philadelphia, PA 19103 (US).

European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

Published:

— with international search report

(88) **Date of publication of the international search report:**
20 October 2005

(15) **Information about Correction:**

Previous Correction:

see PCT Gazette No. 33/2005 of 18 August 2005, Section II

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/24569

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : G06F 17/30 US CL : 707/101, 100, 104, 103R According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 707/101, 100, 104, 103R Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) NPL, IEEE, ACM, WEST		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y, P	US 6,763,350 B2 (AGRAWAL et al.,) 13 July 2004, see the entire document.	1-42
Y, P	U 6,697,818 B2 (LI et al.,) 24 February 2004, see the entire document.	1-42
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 28 October 2004 (28.10.2004)		Date of mailing of the international search report 07 DEC 2004
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer Kim Vu <i>James R. Matthews</i> Telephone No. (703) 305-9000